IBM System x iDataPlex dx360 M4

IBM Redbooks Product Guide

The IBM® System x® iDataPlex® dx360 M4 compute node is designed to optimize density and performance within typical data center infrastructure limits. The unique half-depth form factor is designed to help you improve compute density in your space-constrained data center while also improving system cooling and energy efficiency. With more computing power per watt and the latest Intel Xeon processors including the new Intel Xeon E5-2600 v2, you can reduce costs while maintaining speed and availability.

Suggested use: Web 2.0, HPC clusters and large corporate data processing.

Figure 1. Two dx360 M4 compute nodes installed into a 2U iDataPlex chassis

Did you know?

With options from highly efficient low-voltage 60 W processors to high-performance 135 W processors, you can precisely balance your performance needs against energy usage. Up to two Graphics Processing Units (GPUs) or coprocessors can also be included as expansion options for those specialty workload needs. Networking choices include Ethernet up to 10 Gbps and InfiniBand connectivity. You can also choose from three storage configurations based on performance and capacity needs. A range of power supply selections round out flexible configuration options, so you can choose the right option to support your workloads within your data center power and cooling envelope and budget limits.

Key features

IBM System x iDataPlex is an innovative data center solution that maximizes performance and optimizes energy and space efficiencies.

The iDataPlex dx360 M4 server is a modular, highly dense system, designed around a highly flexible architecture for companies running large scale-out data centers that need energy efficiency, optimized cooling, extreme scalability, high density at the data center level, and high performance at an affordable price. iDataPlex solutions can help cost-effectively scale processing power to meet even the most demanding high-performance computing workloads.

The iDataPlex design is a data center solution for customers finding limitations in their scale-out computing environments. By delivering customized solutions that help reduce overall data center costs, IBM addresses the business growth challenges in the massive scale-out marketplace. The iDataPlex solution incorporates innovative ways to integrate x86-based processing performance at the node, rack, and data center levels. The iDataPlex solution provides customers with outstanding energy and cooling efficiency, multi-rack level manageability, complete flexibility in configuration, and minimal deployment effort.

A typical iDataPlex solution consists of multiple fully populated rack installations. The groundbreaking iDataPlex solution offers increased density in a new rack design. It uses the dimensions of a standard 42U enterprise rack but can hold 100U of equipment, populated with up to 84 servers, plus sixteen 1U vertical slots for switches, appliances, and power distribution units (PDUs). This added density addresses the major problems that prevent most data centers today from reaching their full capacity: insufficient electrical power and excess heat.

The energy-efficient design of the iDataPlex servers and chassis can significantly reduce the incoming energy requirement compared with standard 1U servers. In addition, the optional liquid-cooled IBM Rear Door Heat eXchanger mounted to the back of the rack can remove 100% of the heat generated within the rack, drawing it from the data center before it exits the rack. It can even go beyond that, to the point of helping to cool the data center itself and reducing the need for Computer Room Air Conditioning (CRAC) units. This allows racks to be positioned much closer together, eliminating the need for hot aisles between rows of fully populated racks.

With the iDataPlex chassis design, air needs to travel only 20 inches front to back, rather than the 30 plus inches of a typical enterprise server. This shallow depth is part of the reason that the cooling efficiency of iDataPlex servers is so high–shorter distance means better airflow. In addition, the new design uses four large 80 mm fans per 2U chassis for more efficiency and lower noise than the eight small 40 mm fans used in standard 1U servers. The increased air pressure resulting from the shorter distance through the rack and the larger fans makes for one of the most efficient air-cooled solutions on the market.

Unlike most conventional racks, which are often left largely empty due to power and cooling limitations, the iDataPlex Rack can be fully populated, while removing all rack heat from the data center (up to 100,000 BTUs or 30 kW), using the Rear Door Heat eXchanger. In addition, iDataPlex chassis uses highly efficient (80 PLUS Platinum) power supplies, reducing energy draw and waste heat further.

Scalability and performance

The dx360 M4 offers numerous features to boost performance, improve scalability, and reduce costs:

- The Intel Xeon processor E5-2600 v2 product family improves productivity by offering superior system performance with 12-core processors and up to 3.5 GHz core speeds, up to 25 MB of L3 cache, and QPI interconnect links of up to 8 GTps.

- Two processors, up to 24 cores, and 48 threads maximize the concurrent execution of multi-threaded applications.

- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows CPU cores to run at maximum speeds during peak workloads by temporarily going beyond processor TDP.

- Intel Hyper-Threading Technology boosts performance for multi-threaded applications by enabling simultaneous multi-threading within each processor core, up to two threads per core.

- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better utilize the hardware for virtualization workloads.

- Intel Advanced Vector Extensions (AVT) significantly improve floating point performance for compute-intensive technical and scientific applications compared to previous generation processors.

- Support for high-performance Intel coprocessors and NVIDIA GPGPU adapters which offer significant additional single-precision floating point performance per server.

- 16 DIMMs of registered 1866 MHz or 1600 MHz DDR3 ECC memory provide speed, high availability, and a memory capacity of up to 512 GB.

- The use of solid-state drives (SSDs) instead of or along with traditional spinning drives (HDDs) can significantly improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.

- PCI Express 3.0 I/O expansion capabilities that improve the theoretical maximum bandwidth by 60% (8 GT/s per link) compared with the previous generation of PCI Express 2.0.

- Support for 10 Gb Ethernet and FDR mezzanine cards that offer network performance without consuming a PCIe slot.

- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E5 family. This helps to dramatically reduce I/O latency and increase overall system performance.

- Four USB 2.0 front-mounted ports for connectivity to external flash drives, optical drives, tape drives, and other USB devices.

Manageability and security

Powerful systems management features simplify local and remote management of the dx360 M4:

- The server includes an Integrated Management Module II (IMM2) to monitor server availability and perform remote management.

- Integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.

- Integrated Trusted Platform Module (TPM) 1.2 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.

- IBM Systems Director is included for proactive systems management. It offers comprehensive systems management tools that help to increase up-time, reduce costs, and improve productivity through advanced server management capabilities.

- Intel Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.

- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing the application to run in its own isolated space protected from all other software running on a system.

Energy efficiency

iDataPlex offers the following energy efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to the green environment:

- A shallow chassis design that minimizes the air flow from the front to the back of the server, thereby maximizing cooling effectiveness.

- The dx360 M4 is Energy Star 2.0 compliant. Energy Star is the trusted, US government-backed symbol for energy efficiency, with the goal of helping customers save money and protect the environment through energy efficient products and practices. For the Power and Performance Data Sheet, see http://ibm.com/systems/x/hardware/energy-star

- Optional Rear Door Heat eXchanger that uses liquid cooling to remove from the data center, all heat generated by the servers.

- Large 80 mm fans to maximize air flow efficiencies.

- Choice of three power supplies to match the processor and GPGPU configuration of your servers and maximize energy efficiency.

- The Intel Xeon processor E5-2600 v2 product family offers significantly better performance over the previous generation while fitting into the same thermal design power (TDP) limits.

- Intel Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.

- Low-voltage Intel Xeon processors draw less energy to satisfy demands of power and thermally constrained data centers and telecommunication environments.

- Low-voltage 1.35 V DDR3 memory RDIMMs consume 15% less energy than 1.5 V DDR3 RDIMMs.

- Solid state drives (SSDs) consume as much as 80% less power than traditional spinning 2.5-inch HDDs.

- The server uses hexagonal ventilation holes in the front and rear of the casing, which can be grouped more densely than round holes, providing more efficient airflow through the system.

- IBM Systems Director Active Energy Manager™ provides advanced power management features with actual real-time energy monitoring, reporting, and capping features.

Availability and serviceability

The dx360 M4 and the iDataPlex infrastructure provide many features to simplify serviceability and increase system uptime:

- The 2U chassis supports redundant power supply options, which means greater system uptime.

- All components can be removed from the front of the rack by sliding out the trays or the chassis for easy, quick servicing.

- Tool-less cover removal provides easy access to upgrades and serviceable parts, such as HDDs and memory.

- The dx360 M4 offers memory mirroring and memory rank sparing for redundancy in the event of a non-correctable memory failure.

- Optional RAID arrays enable the server to keep operating in the event of a failure to any one drive.

- Solid-state drivers (SSDs) offer significantly better reliability than traditional mechanical HDDs for greater uptime.

- Predictive Failure Analysis (PFA) detects when system components (processors, memory, and hard disk drives) operate outside of standard thresholds and generates pro-active alerts in advance of possible failure, therefore increasing uptime.

- Built-in Integrated Management Module II (IMM2) continuously monitors system parameters, triggers alerts, and performs recovering actions in case of failures to minimize downtime.

- The IMM2 offers optional remote management capability to enable remote keyboard, video, mouse (KVM) control of the server.

- Three-year customer replaceable unit and onsite limited warranty, next business day 9x5. Optional service upgrades available.

Locations of key components and connectors

Figure 2 shows the two dx360 M4 servers installed in the iDataPlex dx360 M4 2U chassis.
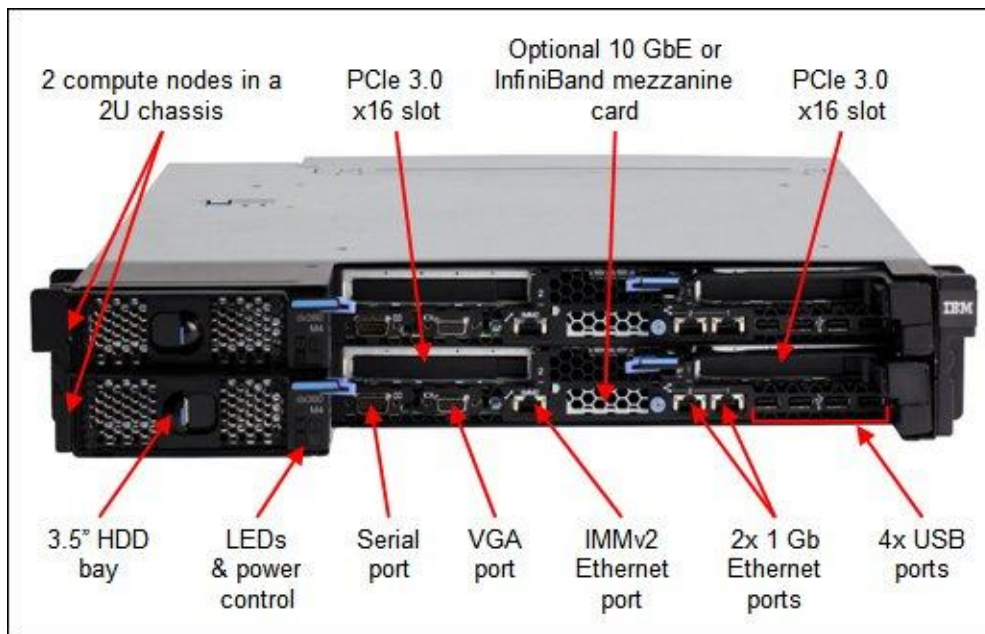

Figure 2. Front view of 2U chassis with two dx360 M4 servers installed

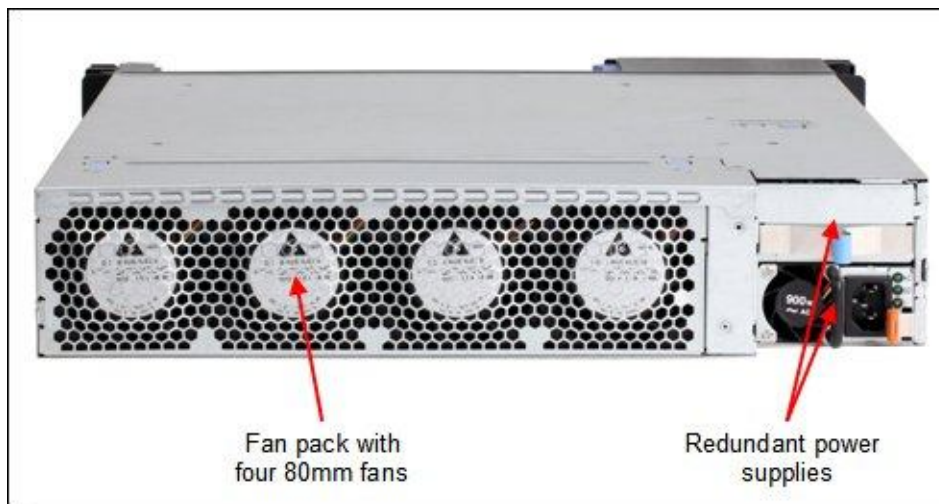Figure 3 shows the rear of the 2U chassis showing the shared fan pack and power supplies.

Figure 3. Rear view of the iDataPlex 2U chassis

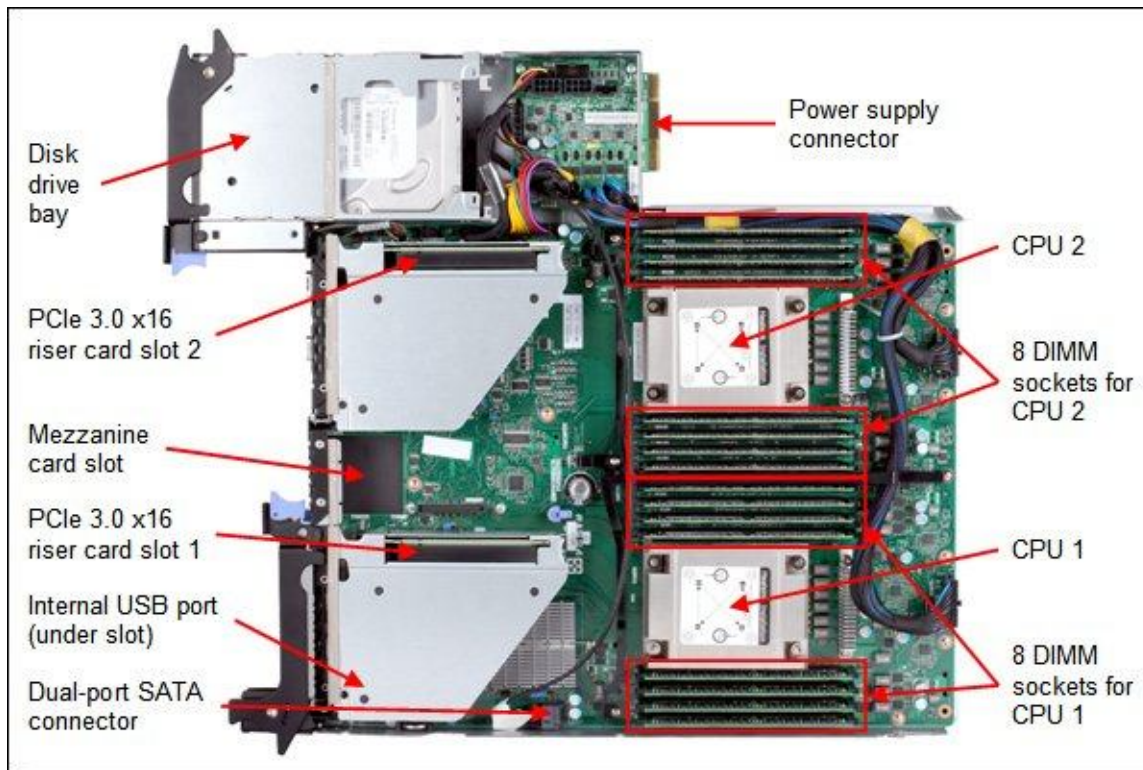Figure 4 shows the locations of key components inside the server.

Figure 4. Inside view of the iDataPlex dx360 M4

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications (part 1)

Components	Specification
Form factor	Half-depth, 2U chassis with up to two planar trays.
Supported chassis	IBM System x iDataPlex dx360 M4 2U chassis, type 7913.
Processor	Two Intel Xeon Processor E5-2600 or E5-2600 v2 series processors; QuickPath Interconnect (QPI) links speed up to 8.0 GTps. Hyper-Threading Technology and Turbo Boost Technology. Intel C602J (Patsburg-J) chipset. Up to 12 cores per processor. Core speeds up to 3.5 GHz. Integrated L3 cache up to 25 MB.
Memory cache	Up to 20 MB.
Chipset	Intel C600 Series.
Memory	Up to 16 DIMM sockets (8 DIMMs per processor) supporting DDR3 DIMMs. Four memory channels per processor (two DIMMs per channel). For E5-2600-based systems: RDIMMs with memory speeds of 1600 MHz or 1333 MHz, or UDIMMS at 1333 MHz are supported. For E5-2600 v2-based systems: RDIMMs with memory speeds of 1866 MHz or 1600 MHz, or UDIMMS at 1600 MHz are supported.
Memory maximums	For E5-2600-based systems: Up to 512 GB with 16x 32 GB LRDIMMs and two processors. For E5-2600 v2-based systems: Up to 256 GB with 16x 16 GB LRDIMMs and two processors.
Memory protection	ECC, memory mirroring, and memory sparing.
Disk drive bays	One 3.5" simple-swap SATA or two 2.5" simple swap SAS/SATA HDDs or SSDs, or four 1.8" simple-swap SSDs.
Maximum internal storage	Up to 8.0 TB per 2U chassis using two 4TB 3.5-inch drives.
RAID support	Two-port 6 Gbps PCIe 3.0 SATA controller with Intel C600 chipset. Optional RAID with supported 6Gbps RAID controllers.
Optical drive bays	No internal bays. Use an external USB drive such as the IBM and Lenovo part number 73P4515 or 73P4516.
Tape drive bays	No internal bays. Use an external USB drive.
Network interfaces	Two Gigabit Ethernet ports using onboard Intel I350 Gb Ethernet controller. Optionally, two FDR InfiniBand ports or two 10 GbE ports via a mezzanine card (which does not occupy a PCIe slot).
PCI Expansion slots	One PCIe 3.0 x8 mezzanine slot supports 10 GbE or InfiniBand. Standard models include two riser cards, each riser providing one slot: • Slot 1: PCIe 3.0 x16 - full-height/half-length • Slot 2: PCIe 3.0 x16 - full-height/half-length Use of both riser slots requires two CPUs to be installed. For CTO configurations, alternative risers can be used with PCIe chassis trays to provide GPU support. With a GPGPU chassis tray installed in the chassis (one node per 2U chassis): • 2x PCIe 3.0 x16 (for GPU or coprocessor) - full-height/full-length/double-wide • 2x PCIe 3.0 x8 (x16 mechanical) - full-height/half-length

Table 1. Standard specifications (part 2)

Components	Specification
Ports	One RS232 serial port, one VGA port, one 1 Gbps RJ45 connector for dedicated systems management (wired to the IMM), a slot for the mezzanine card ports (SFP+ or 10BaseT RJ45 depending on the card), two 1 Gbps Ethernet ports, five USB 2.0 ports - four on the front of the server, one internal.
Cooling	Supplied by the 2U chassis using four 80mm fans in the standard fan pack.
Power supply	Supplied by the 2U chassis; 1 standard, 2 maximum; Options are 550 W, 750 W, or 900 W, all with 80 PLUS Platinum certification. When two are installed, they form a redundant pair. iDataPlex rack offers Direct Dock power cord connections for easy installation and removal. Chassis 7913-A2x includes one 900W High Efficiency Platinum AC Power Supply (second supply optional).
Systems management	UEFI, IBM Integrated Management Module II (IMM2) with Renesas SH7757 controller, Predictive Failure Analysis, Light Path Diagnostics, Automatic Server Restart, IBM Systems Director and IBM Systems Director Active Energy Manager, IBM ServerGuide.
Video	Matrox G200eR2 video core with 16 MB DDR3 video memory integrated into the IMM2. Maximum resolution is 1600x1200 with 16M colors (32 bpp) at 75 Hz, or 1680x1050 with 16M colors at 60 Hz.
Security features	Power-on password, administrator's password, Trusted Platform Module 1.2.
Operating systems supported	Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Microsoft Windows Server 2008 R2 and 2008, VMware vSphere Hypervisor.
Limited warranty	3-year customer-replaceable unit and onsite limited warranty with 9x5/NBD.
Service and support	Optional service upgrades are available through IBM ServicePacs®: 4-hour or 2-hour response time, 8-hour fix time, 1-year or 2-year warranty extension, remote technical support for IBM hardware and some IBM and OEM software.
Dimensions	dx360 M4 server: Width: 444 mm (17.5"), height: 46 mm (1.8"), depth: 509 mm (20.0") 2U chassis: Width: 446 mm (17.6"), height: 87 mm (3.4"), depth: 555 mm (21.8")
Weight	dx360 M4 weight: 6.7 kg (with 1 processor and 2 DIMMs) 2U chassis weight (no servers): 5.4 kg (shell without power supplies), 7.2 kg (with two power supplies)

The dx360 M4 servers are shipped with the following items:

● Statement of Limited Warranty
● Important Notices
● Documentation CD that contains the *Installation and User's Guide*

Standard models

The following table lists the standard models.

Table 2. Standard models

Model	Processor† (2 maximum)	Memory and speed	RAID controller	Disk bays	Disks	Network	Optical
Models announced March 2012							
7912-22x	2x Intel Xeon E5-2630L 6C 2.0GHz 15MB 1333MHz 60W	4x 8 GB 1333 MHz	6 Gbps SATA	1x 3.5" SS bay	Open	2x GbE	None
7912-42x	2x Intel Xeon E5-2609 4C 2.40GHz 10MB 1066MHz 80W	4x 4 GB 1066 MHz	6 Gbps SATA	2x 2.5" or 4x 1.8" SS bays	Open	2x GbE + 2x QDR*	None
7912-62x	2x Intel Xeon E5-2660 8C 2.2GHz 20MB 1600MHz 95W	4x 8 GB 1333 MHz	6 Gbps SATA	2x 2.5" or 4x 1.8" SS bays	Open	2x GbE + 2x QDR*	None
Models announced September 2013							
7912-13x	2x Intel Xeon E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	4x 4 GB 1600 MHz	6 Gbps SATA	1x 3.5" SS bay	Open	2x GbE	None
7912-63x	2x Intel Xeon E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	4x 8 GB 1866 MHz	6 Gbps SATA	2x 2.5" or 4x 1.8" SS bays	Open	2x GbE	None
7912-83x	2x Intel Xeon E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	4x 8 GB 1866 MHz	6 Gbps SATA	1x 3.5" SS bay	Open	2x GbE	None

† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, power consumption.
* Models 42x and 62x include a Mellanox ConnectX-3 Dual Port QDR/FDR10 Mezzanine Card, 90Y6338, which installs in the dedicated mezzanine slot.

Refer to the Specifications section for information about standard features of the server.

2U chassis configurations

The dx360 M4 is supported in the IBM System x iDataPlex dx360 M4 2U chassis, type 7913. The standard chassis model is listed in the following table.

Table 3. Standard 2U chassis models

Model	Description	Fan pack (std / max)	Power (std / max)
Models announced March 2012			
7913-A2x	IBM System x iDataPlex dx360 M4 2U chassis	1 (4x 80mm) / 1	1x 900 W / 2

The chassis ships with these:

- Rail kit
- AC power cord, 12A, IEC320 C14 to C13

One or two servers are supported in the 2U chassis depending on the whether a PCIe tray is attached:

- Compute-intensive configurations

    For the highest compute performance, two servers are installed in one single 2U chassis. Each server can have:

    - Two PCIe 3.0 x16 full-height/half-length adapters (a total of four in the 2U chassis)
    - One 3.5" simple-swap SATA drive, or two 2.5" simple swap SAS/SATA HDDs, or SSDs, or four 1.8" simple-swap SSDs

    Figure 2 shows this chassis configuration.

- GPU and coprocessor configurations

    The PCIe tray (feature code A1UH) attaches to a single dx360 M4 server and forms a 2U server that installs in the 2U chassis. With two 2U riser cards, the combined unit has the following expansions:

    - Two double-wide PCIe graphics cards in the upper half of the chassis, slots 3 and 4, each PCIe 3.0 x16 supporting full-height, full-length, double-width PCIe adapters
    - Two PCIe cards in the lower half of the chassis, slots 1 and 2, each PCIe 3.0 x8 supporting full-height, half-length PCIe adapters
    - Two disk bays on the left for either two 3.5-inch disk drives, four 2.5-inch disk drives, or eight 1.8-inch solid-state disks

Figure 5 shows the configuration with the PCIe tray.

Slot 1: PCIe 3.0 x8 full-height, half-length
Slot 2: PCIe 3.0 x8 full-height, half-length
Slot 3: PCIe 3.0 x16 full-height, full-length, double-width GPU or coprocessor
Slot 4: PCIe 3.0 x16 full-height, full-length, double-width GPU or coprocessor
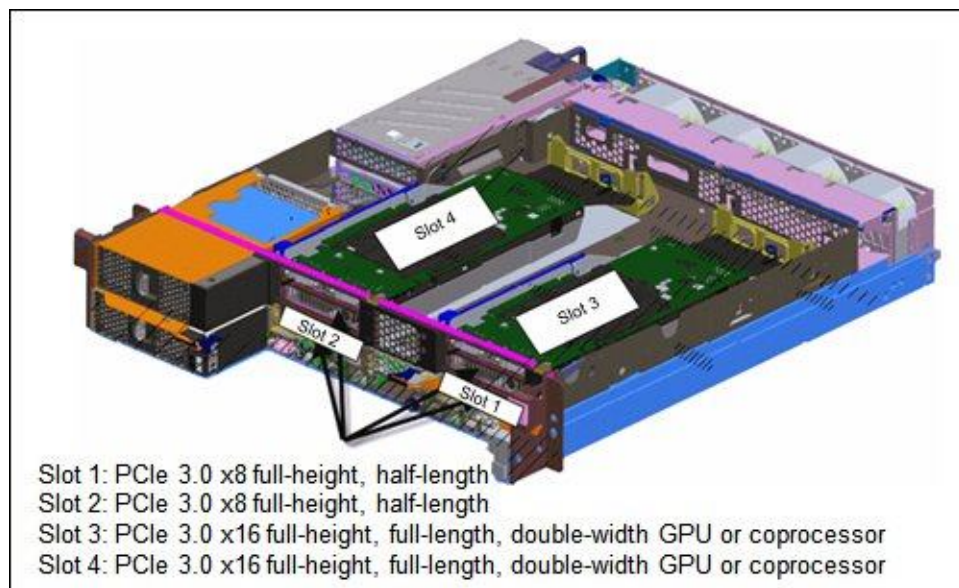
Figure 5. PCIe tray

Each iDataPlex chassis provides a shared high-efficiency power supply and fans. The iDataPlex uses Direct Dock Power to power the nodes in the chassis. Industry standard power cords power each node, but the cords are attached to the rack in a fixed location. When you slide in the chassis, the power receptacle of the chassis simply connects to the power cord, which means that you do not have to access the rear of the rack to attach the power cord.

Processor options

The dx360 M4 supports the processor options listed in the following table.

Table 4. Processor options (Part 1)

Feature code	Intel Xeon processors*	Where used
Intel Xeon Processor E5-2600 family (requires dx360 M4 base feature code A1T3)		
A1TE	Intel Xeon Processor E5-2603 4C 1.8GHz 10MB Cache 1066MHz 80W	-
A1TG	Intel Xeon Processor E5-2609 4C 2.40GHz 10MB Cache 1066MHz 80W	42x
A1TH	Intel Xeon Processor E5-2620 6C 2.0GHz 15MB Cache 1333MHz 95W	-
A1TJ	Intel Xeon Processor E5-2630 6C 2.3GHz 15MB Cache 1333MHz 95W	-
A1TS	Intel Xeon Processor E5-2630L 6C 2.0GHz 15MB Cache 1333MHz 60W	22x
A1TF	Intel Xeon Processor E5-2637 2C 3.0GHz 5MB Cache 1600MHz 80W	-
A1TK	Intel Xeon Processor E5-2640 6C 2.5GHz 15MB Cache 1333MHz 95W	-
A2FV	Intel Xeon Processor E5-2648L 8C 1.8GHz 20MB Cache 1600MHz 70W	-
A1TL	Intel Xeon Processor E5-2650 8C 2.0GHz 20MB Cache 1600MHz 95W	-
A1TT	Intel Xeon Processor E5-2650L 8C 1.8GHz 20MB Cache 1600MHz 70W	-
A1TR	Intel Xeon Processor E5-2658 8C 2.1GHz 20MB Cache 1600MHz 95W	-
A1TM	Intel Xeon Processor E5-2660 8C 2.2GHz 20MB Cache 1600MHz 95W	62x
A2FW	Intel Xeon Processor E5-2665 8C 2.4GHz 20MB Cache 1600MHz 115W	-
A1TQ	Intel Xeon Processor E5-2667 6C 2.9GHz 15MB Cache 1600MHz 130W	-
A1TU	Intel Xeon Processor E5-2670 8C 2.6GHz 20MB Cache 1600MHz 115W	-
A1TN	Intel Xeon Processor E5-2680 8C 2.7GHz 20MB Cache 1600MHz 130W	-
A3MY	Intel Xeon Processor E5-2690 8C 2.9GHz 20MB Cache 1600MHz 135W	-

* Processor detail: model, core speed, cores, L3 cache, memory speed, TDP power

Table 4. Processor options (Part 2)

Feature code	Intel Xeon processors*	Where used
Intel Xeon Processor E5-2600 v2 family (requires dx360 M4 base feature code A4BV)		
A455	Intel Xeon Processor E5-2603 v2 4C 1.8GHz 10MB Cache 1333MHz 80W	-
A456	Intel Xeon Processor E5-2609 v2 4C 2.5GHz 10MB Cache 1333MHz 80W	-
A45F	Intel Xeon Processor E5-2618L v2 6C 2.0GHz 15MB Cache 1333MHz 50W	-
A3ZA	Intel Xeon Processor E5-2620 v2 6C 2.1GHz 15MB Cache 1600MHz 80W	13x
A45G	Intel Xeon Processor E5-2628L v2 8C 2.2GHz 20MB Cache 1600MHz 70W	-
A457	Intel Xeon Processor E5-2630 v2 6C 2.6GHz 15MB Cache 1600MHz 80W	-
A45D	Intel Xeon Processor E5-2630L v2 6C 2.4GHz 15MB Cache 1600MHz 60W	-
A45A	Intel Xeon Processor E5-2637 v2 4C 3.5GHz 15MB Cache 1866MHz 130W	-
A458	Intel Xeon Processor E5-2640 v2 8C 2.0GHz 20MB Cache 1600MHz 95W	-
A45B	Intel Xeon Processor E5-2643 v2 6C 3.5GHz 25MB Cache 1866MHz 130W	-
A45H	Intel Xeon Processor E5-2648L v2 10C 2.0GHz 25MB Cache 1866MHz 70W	-
A40M	Intel Xeon Processor E5-2650 v2 8C 2.6GHz 20MB Cache 1866MHz 95W	63x
A45E	Intel Xeon Processor E5-2650L v2 10C 1.7GHz 25MB Cache 1600MHz 70W	-
A45J	Intel Xeon Processor E5-2658 v2 10C 2.4GHz 25MB Cache 1866MHz 95W	-
A3ZB	Intel Xeon Processor E5-2660 v2 10C 2.2GHz 25MB Cache 1866MHz 95W	-
A45C	Intel Xeon Processor E5-2667 v2 8C 3.3GHz 25MB Cache 1866MHz 130W	-
A40N	Intel Xeon Processor E5-2670 v2 10C 2.5GHz 25MB Cache 1866MHz 115W	83x
A3ZC	Intel Xeon Processor E5-2680 v2 10C 2.8GHz 25MB Cache 1866MHz 115W	-
A459	Intel Xeon Processor E5-2690 v2 10C 3.0GHz 25MB Cache 1866MHz 130W	-
A3TZ	Intel Xeon Processor E5-2695 v2 12C 2.4GHz 30MB Cache 1866MHz 115W	-
A3TY	Intel Xeon Processor E5-2697 v2 12C 2.7GHz 30MB Cache 1866MHz 130W	-

Memory options

IBM DDR3 memory is compatibility tested and tuned for optimal System x performance and throughput. IBM memory specifications are integrated into the light path diagnostics for immediate system performance feedback and optimum system uptime. From a service and support standpoint, IBM memory automatically assumes the IBM system warranty, and IBM provides service and support worldwide.

The dx360 M4 supports DDR3 memory. The server supports up to eight DIMMs when one processor is installed and up to 16 DIMMs when two processors are installed. Each processor has four memory channels, and there are two DIMMs per memory channel (2 DPC). Up to 16 LRDIMMs, RDIMMs or UDIMMs are supported (8 per processor).

In the dx360 M4, the maximum memory speed of a configuration is the lower of the following two values:

● The memory speed of the processor (See Table 4.)
● The memory speed of the DIMM (See Table 5 or Table 6)

The server supports both 1.5 V and 1.35 V DIMMs. Mixing 1.5 V and 1.35 V DIMMs in the same server is supported. In such a case all DIMMs operate at 1.5 V.

The following memory protection technologies are supported:

- ECC
- Memory mirroring
- Memory rank sparing

If memory mirroring is used, then DIMMs must be installed in pairs (minimum of one pair per each CPU), and both DIMMs in a pair must be identical in type and size. If memory sparing is used, then DIMMs must be installed in sets of three, and all DIMMs in the same set must be identical in type and size.

The following two tables lists memory options available for the dx360 M4 server. The first table is memory options for systems with E5-2600 processors. The second table is memory options for systems with E5-2600 v2 processors.

Table 5. Memory options for systems with Intel Xeon Processor E5-2600 family (requires dx360 M4 base feature code A1T3)

Part number	Feature code	Description	Maximum supported	Models where used
UDIMMs				
49Y1403	A0QS	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 ECC DDR3 1333MHz LP UDIMM	16	-
49Y1404	8648	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP UDIMM	16	-
RDIMMs - 1333 MHz				
49Y1405	8940	2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	16	-
49Y1406	8941	4GB (1x4GB, 1Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	16	42x
49Y1397	8923	8GB (1x8GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	16	22x, 62x
49Y1563	A1QT	16GB (1x16GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	16	-
RDIMMs - 1600 MHz				
90Y3178	A24L	4GB (1x4GB, 2Rx8, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	-
90Y3109	A292	8GB (1x8GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	-
00D4968	A2U5	16GB (1x16GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	-
LRDIMMs				
90Y3105	A291	32GB (1x32GB, 4Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP LRDIMM	16	-

Table 6. Memory options for systems with Intel Xeon Processor E5-2600 v2 family (requires dx360 M4 base feature code A4BV)

Part number	Feature code	Description	Maximum supported	Models where used
UDIMMs				
00D5012	A3QB	4GB (1x4GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	16	-
RDIMMs - 1600 MHz				
00D5024	A3QE	4GB (1x4GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	-
46W0735	A3ZD	4GB (1x4GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	13x
00D5036	A3QH	8GB (1x8GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	-
00D5044	A3QK	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	-
46W0672	A3QM	16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	16	-
RDIMMs - 1866 MHz				
00D5020	A3QD	4GB (1x4GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	16	-
00D5028	A3QF	4GB (1x4GB, 2Rx8, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	16	-
00D5032	A3QG	8GB (1x8GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	16	-
00D5040	A3QJ	8GB (1x8GB, 2Rx8, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	16	63x, 83x
00D5048	A3QL	16GB (1x16GB, 2Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	16	-

The following table shows the maximum memory speeds that are achievable for systems with E5-2600 processors based on the installed DIMMs and the number of DIMMs per channel. In the table, cells highlighted with a grey background indicate when the specific combination of DIMM voltage and number of DIMMs per channel still allows the DIMMs to operate at rated speed.

Table 7. Maximum memory speeds for systems with Intel Xeon Processor E5-2600 family (requires dx360 M4 base feature code A1T3)

Part number	Ranks	DIMM capacity	Rated speed	Rated voltage	Maximum memory channel speed and voltage support by DIMM per channel			
					1 DIMM per channel		2 DIMMs per channel	
					1.35 V	1.5 V	1.35 V	1.5 V
UDIMMs								
49Y1403	1	2 GB	1333 MHz	1.35V	1333 MHz	1333 MHz	1333 MHz	1333 MHz
49Y1404	2	4 GB	1333 MHz	1.35 V	1333 MHz	1333 MHz	1333 MHz	1333 MHz
RDIMMs - 1333 MHz								
49Y1405	1	2 GB	1333 MHz	1.35 V	1333 MHz	1333 MHz	1333 MHz	1333 MHz
49Y1406	1	4 GB	1333 MHz	1.35 V	1333 MHz	1333 MHz	1333 MHz	1333 MHz
49Y1397	2	8 GB	1333 MHz	1.35 V	1333 MHz	1333 MHz	1333 MHz	1333 MHz
49Y1563	2	16 GB	1333 MHz	1.35 V	1333 MHz	1333 MHz	1333 MHz	1333 MHz
RDIMMs - 1600 MHz								
90Y3178	2	4 GB	1600 MHz	1.5 V	No support	1600 MHz	No support	1600 MHz
90Y3109	2	8 GB	1600 MHz	1.5 V	No support	1600 MHz	No support	1600 MHz
00D4968	2	16 GB	1600 MHz	1.5 V	No support	1600 MHz	No support	1600 MHz
LRDIMMs								
90Y3105	4	32 GB	1333 MHz	1.35V	1066 MHz	1333 MHz	1066 MHz	1333 MHz

The following table shows the maximum memory speeds that are achievable for systems with E5-2600 v2 processors based on the installed DIMMs and the number of DIMMs per channel. In the table, cells highlighted with a grey background indicate when the specific combination of DIMM voltage and number of DIMMs per channel still allows the DIMMs to operate at rated speed.

Table 8. Maximum memory speeds for systems with Intel Xeon Processor E5-2600 v2 family (requires dx360 M4 base feature code A4BV)

Part number	Ranks	DIMM capacity	Rated speed	Rated voltage	Maximum memory channel speed and voltage support by DIMM per channel			
					1 DIMM per channel		2 DIMMs per channel	
					1.35 V	1.5 V	1.35 V	1.5 V
UDIMMs								
00D5012	2	4 GB	1600 MHz	1.35 V	1600 MHz	1600 MHz	1600 MHz	1600 MHz
RDIMMs - 1600 MHz								
00D5024	1	4 GB	1600 MHz	1.35 V	1600 MHz	1600 MHz	1600 MHz	1600 MHz
46W0735	2	4 GB	1600 MHz	1.35 V	1600 MHz	1600 MHz	1600 MHz	1600 MHz
00D5036	1	8 GB	1600 MHz	1.35 V	1600 MHz	1600 MHz	1600 MHz	1600 MHz
00D5044	2	8 GB	1600 MHz	1.35 V	1600 MHz	1600 MHz	1600 MHz	1600 MHz
46W0672	2	16 GB	1600 MHz	1.35 V	1600 MHz	1600 MHz	1600 MHz	1600 MHz
RDIMMs - 1866 MHz								
00D5020	1	4 GB	1866 MHz	1.5 V	No support	1866 MHz	No support	1866 MHz
00D5028	2	4 GB	1866 MHz	1.5 V	No support	1866 MHz	No support	1866 MHz
00D5032	1	8 GB	1866 MHz	1.5 V	No support	1866 MHz	No support	1866 MHz
00D5040	2	8 GB	1866 MHz	1.5 V	No support	1866 MHz	No support	1866 MHz
00D5048	2	16 GB	1866 MHz	1.5 V	No support	1866 MHz	No support	1866 MHz

Internal storage

As described in "Chassis configurations," the iDataPlex dx360 M4 server supports 3.5" simple-swap SATA drives, 2.5" simple-swap SAS/SATA HDDs or SSDs, or 1.8" simple-swap SSDs. The number of drives supported depends on the configuration as listed in the following table. The table also lists the adapters supported for each drive configuration.

Table 6. Drive type and RAID adapter support.

Configuration	Drive type	Quantity of drives	Software RAID or no RAID		Hardware RAID using ServeRAID adapter	
			On board SATA	With IBM 6 Gb Performance HBA	With H1110	With M1115
Compute-intensive	3.5" SS SATA	1	Yes	No	No	No
	2.5" SS SATA	2	Yes	No	Yes	Yes
	2.5" SS SAS	2	No	No	Yes	Yes
	2.5" SS SSD	2	No	Yes	No	No
	1.8" SS SSD	4	No	Yes	No	No
GPGPU	3.5" SS SATA	2	Yes	No	Yes	Yes
	2.5" SS SATA	4	No	No	No	Yes
	2.5" SS SAS	4	No	No	No	Yes
	2.5" SS SSD	4	No	Yes	No	No
	1.8" SS SSD	8	No	Yes	No	No

Controllers for internal storage

The following table lists the RAID controllers and additional options used for internal disk storage of the dx360 M4 server.

Table 7. RAID controllers for internal storage

Part number	Feature code	Description
81Y4492	A1XL	IBM ServeRAID H1110 SAS/SATA Controller
81Y4448	A1MZ	IBM ServeRAID M1115 SAS/SATA Controller
81Y4481	A1WW	IBM ServeRAID M5110 SAS/SATA Controller
46M0907	5982	IBM 6Gb SAS HBA
46M0912	3876	IBM 6Gb Performance Optimized HBA

The ServeRAID H1110 adapter has the following specifications:

- Four internal 6 Gbps SAS/SATA ports.
- One x4 mini-SAS internal connector (SFF-8087).
- 6 Gbps throughput per port.
- Based on LSI SAS2004 6 Gbps RAID on Chip (ROC) controller.
- x4 PCI Express 2.0 host interface.
- Supports RAID 0, 1, 1E, and 10.
- SAS and SATA drives are supported, but the mixing of SAS and SATA in the same integrated volume is not supported.
- Supports up to two integrated volumes.
- Supports up to two global hot-spare drives.
- Supports drive sizes greater than 2 TB for RAID 0, 1E, and 10 (not RAID 1).
- Fixed stripe size of 64 KB.

The IBM ServeRAID M1115 adapter has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M1100 Series RAID 5 upgrades
- 6 Gbps throughput per port
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS2008 6 Gbps ROC controller

The IBM ServeRAID M5110 adapter has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Supports 512 MB battery-backed cache or 512 MB or 1 TB flash-backed cache
- 6 Gbps throughput per port
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller

The IBM 6Gb SAS Host Bus Adapter has the following specifications:

- Four internal SATA connectors
- One external SAS x4 connector (SFF-8088)
- PCI Express x8 2.0 host interface
- SAS Controller: LSI SAS2008
- 6 Gbps per port data transfer rate
- MD2 small form factor
- High performance I/O Processor: PowerPC® 440 @ 533 MHz
- RAID levels : None (uses RAID as provided by external disk enclosures)
- Maximum endpoint devices: 512

The IBM 6Gb Performance Optimized HBA has the following specifications:

● Two internal mini-SAS x4 connectors (SFF-8087)
● PCI Express x8 2.0 host interface
● SAS Controller: LSI SAS2008
● 6 Gbps per port data transfer rate
● MD2 small form factor
● High performance I/O Processor: PowerPC 440 @ 533MHz
● RAID levels : None (uses RAID as provided by external disk enclosures)
● Maximum endpoint devices: 256

For more information, see the list of IBM Redbooks® Product Guides in the RAID adapters category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=raid

Internal drive options

The following table lists hard drive options for internal disk storage of dx360 M4 server.

Table 8. Disk drive options for internal disk storage (Part 1)

Part number	Feature code	Description
3.5" Simple-Swap NL SATA HDDs		
49Y6012	A3WA	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD
81Y9814	A22V	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD
81Y9810	A22W	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD
81Y9806	A22X	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD
81Y9802	A22U	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD
2.5" Simple-Swap 10K SAS		
00AD080	A4CG	IBM 1.2TB 10K 6Gbps SAS 2.5" SS HDD
81Y9654	A24H	IBM 900GB 10K 6Gbps SAS 2.5" SFF SS HDD
49Y2027	5435	IBM 600GB 10K 6Gbps SAS 2.5" SFF SS HDD
49Y1991	5427	IBM 300GB 10K 6Gbps SAS 2.5" SFF SS HDD
2.5" Simple-Swap 15K SAS		
81Y9674	A24J	IBM 300GB 15K 6Gbps SAS 2.5" SFF SS HDD
49Y1996	5426	IBM 146GB 15K 6Gbps SAS 2.5" SFF SS HDD
2.5" Simple-Swap SAS-SSD Hybrid Drives		
00AD107	A4G8	IBM 600GB 10K 6Gbps SAS 2.5" G2SS Hybrid
2.5" Simple-Swap NL SATA HDDs		
81Y9742	A1P2	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF SS HDD
81Y9738	A1P0	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF SS HDD
81Y9734	A1NY	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF SS HDD

Table 8. Disk drive options for internal disk storage (Part 1)

Part number	Feature code	Description
2.5" Simple-Swap SSDs - Enterprise		
41Y8361	A4FR	S3700 800GB SATA 2.5" MLC SS Enterprise SSD
41Y8356	A4FP	S3700 400GB SATA 2.5" MLC SS Enterprise SSD
41Y8351	A4FM	S3700 200GB SATA 2.5" MLC SS Enterprise SSD
49Y6200	A4GJ	IBM 1.6TB SAS 2.5" MLC SS Enterprise SSD
49Y6154	A3F1	IBM 800GB SAS 2.5" MLC SS Enterprise SSD
49Y6149	A3EZ	IBM 400GB SAS 2.5" MLC SS Enterprise SSD
49Y6144	A3EX	IBM 200GB SAS 2.5" MLC SS Enterprise SSD
00W1130	A3HS	IBM 100GB SATA 2.5" MLC SS Enterprise SSD
2.5" Simple-Swap SSDs - Enterprise Value		
00AJ020	A4KR	S3500 120GB SATA 2.5" MLC SS Enterprise Value SSD
00AJ025	A4KS	S3500 240GB SATA 2.5" MLC SS Enterprise Value SSD
00AJ030	A4KT	S3500 480GB SATA 2.5" MLC SS Enterprise Value SSD
00AJ035	A4KU	S3500 800GB SATA 2.5" MLC SS Enterprise Value SSD
00AJ040	A4KV	S3500 80GB SATA 1.8" MLC Enterprise Value SSD
49Y5849	A3AT	IBM 64GB SATA 2.5" MLC SS Enterprise Value SSD
49Y5854	A3AV	IBM 512GB SATA 2.5" MLC SS Enterprise Value SSD
90Y8663	A2UC	IBM 256GB SATA 2.5" MLC SS Enterprise Value SSD
90Y8668	A2UB	IBM 128GB SATA 2.5" MLC SS Enterprise Value SSD
1.8" Simple-Swap SSDs		
43W7726	5428	IBM 50GB SATA 1.8" MLC SSD

For information about solid state drives, see the IBM Redbooks at-a-glance guide *Solid State Drives for IBM BladeCenter® and System x servers*, available from:
http://www.redbooks.ibm.com/abstracts/tips0792.html?Open

Internal tape drives

The server does not support internal tape drive options.

Optical drives

The server does not support internal optical drive options. Instead, use an external USB drive, such as the IBM and Lenovo part number 73P4515 or 73P4516.

GPU and coprocessor adapters

The dx360 M4 supports GPU adapters and coprocessors when the PCIe tray is attached, as described in "Chassis configurations." The following table lists the supported adapters.

The operating systems supported by each GPU and coprocessor adapter is listed in the Supported operating systems section.

Table 9. GPU and coprocessor support

Part number	Feature code	Description	Maximum supported
00J6162	A3GP	Intel Xeon Phi 7120P	2
00J6163	A3GQ	Intel Xeon Phi 5110P	2
00J6164	A3J7	NVIDIA Tesla K20	2
00J6165	A3J8	NVIDIA Tesla K20X	2
00J6160	A3GM	NVIDIA VGX K1	2
00J6161	A3GN	NVIDIA VGX K2	2
00D4192	A36S	NVIDIA Tesla K10	2
94Y5960	A1R4	NVIDIA Tesla M2090, 6 GB GDDR5	2
90Y6492	A105	NVIDIA Tesla M2070Q	2
94Y5958	A1R3	NVIDIA Quadro 5000, 2.5 GB GDDR5	2

Network adapters

The dx360 M4 offers two Gigabit Ethernet ports with the following features:

- Intel I350 Gb Ethernet controller
- IEEE 802.3 Ethernet interface for 1000BASE-T, 100BASE-TX, and 10BASE-T applications (802.3, 802.3u, and 802.3ab)
- IPv6 Offloads: Checksum, LSO
- Wake on LAN support
- Virtualization: I/OAT, VMDq (8 queues per port), SR-IOV (PCI SIG compliant)
- 16 TX & 16 RX queues per port
- Supports MSI-X
- Supports SGMII, SCTP, NC-SI
- Supports IEEE 1588 (TimeSynch) per packet
- Supports Energy Efficient Ethernet

The iDataPlex dx360 M4 server also supports an additional mezzanine card with a dedicated PCIe x8 slot at the front of the chassis, as shown in Figure 2. The supported adapters are listed in the following table.

Table 10. Mezzanine adapters

Part number	Feature code	Description
10 Gb Ethernet Mezzanine Card		
90Y6454	A22H	QLogic Dual Port 10GbE SFP+ Embedded VFA for IBM System x
90Y5179	A2TF	Qlogic Embedded VFA FCoE/iSCSI License for IBM System x (FoD)
90Y6456*	A22J*	Emulex Dual Port 10GbE SFP+ Embedded VFA III for IBM System x
49Y7980	A3JS	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter for IBM System x
49Y7990	A3JT	Intel X540 Dual Port 10GBase-T Embedded Adapter for IBM System x
InfiniBand Mezzanine Card		
90Y6338	A24F	Mellanox ConnectX-3 2-port QDR/FDR-10 Mezzanine Adapter
00D4143	A36R	IBM Dual Port FDR Embedded Adapter

* Not supported in systems with Intel Xeon E5-2600 v2 processors.

Table 11. Network adapters

Part number	Feature code	Description
10 Gb Ethernet		
42C1820	1637	Brocade 10 Gb Dual-port CNA for IBM System x
49Y7950*	A18Z*	Emulex 10 GbE Virtual Fabric Adapter II for IBM System x
95Y3762*	A2U1*	Emulex Dual Port 10GbE SFP+ VFA III for IBM System x
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x
00D9690	A3PM	Mellanox ConnectX-3 10 GbE Adapter for IBM System x
81Y9990	A1M4	Mellanox ConnectX-2 Dual Port 10GbE Adapter for IBM System x
90Y4600	A3MR	QLogic 8200 Dual Port 10GbE SFP+ VFA for IBM System x
42C1800	5751	QLogic 10 Gb Dual Port CNA for IBM System x
47C9952	A47H	Solarflare SFN5162F MR Dual Port 10GbE SFP+ Adapter for IBM System x
47C9960	A47J	Solarflare SFN6122F LL Dual Port 10GbE SFP+ Adapter for IBM System x
Gigabit Ethernet		
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x
42C1780	2995	NetXtreme II 1000 Express Dual Port Ethernet Adapter
InfiniBand		
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x

* Not supported in systems with Intel Xeon E5-2600 v2 processors.

Storage host bus adapters

The following table lists storage HBAs supported by the dx360 M4 server.

Table 12. Storage adapters

Part number	Feature code	Description
Fibre Channel - 16 Gb		
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x
Fibre Channel - 8 Gb		
46M6049	3589	Brocade 8 Gb FC Single-port HBA for IBM System x
46M6050	3591	Brocade 8 Gb FC Dual-port HBA for IBM System x
42D0485	3580	Emulex 8 Gb FC Single-port HBA for IBM System x
42D0494	3581	Emulex 8 Gb FC Dual-port HBA for IBM System x
42D0501	3578	QLogic 8 Gb FC Single-port HBA for IBM System x
42D0510	3579	QLogic 8 Gb FC Dual-port HBA for IBM System x
Fibre Channel - 4 Gb		
42C2071	1699	Emulex 4Gb FC Dual-Port PCI-E HBA for IBM System x
42C2069	1698	Emulex 4Gb FC Single-Port PCI-E HBA for IBM System x
39R6527	3568	QLogic 4Gb FC Dual-Port PCIe HBA for IBM System x
39R6525	3567	QLogic 4Gb FC Single-Port PCIe HBA for IBM System x
SAS		
46M0907	5982	IBM 6 Gb SAS HBA Controller

PCIe SSD adapters

The server supports the High IOPS SSD adapters listed in the following table.

Table 13. High IOPS SSD adapters

Part number	Feature code	Description	Maximum supported
46C9078	A3J3	IBM 365GB High IOPS MLC Mono Adapter	2
46C9081	A3J4	IBM 785GB High IOPS MLC Mono Adapter	2
90Y4377	A3DY	IBM 1.2TB High IOPS MLC Mono Adapter	2
90Y4397	A3DZ	IBM 2.4TB High IOPS MLC Duo Adapter	2
90Y4361	A3MZ	IBM 300GB High IOPS MLC Modular Adapter	2
90Y4365	A3N0	IBM 600GB High IOPS MLC Modular Adapter	2
90Y4369	A3N1	IBM 800GB High IOPS MLC Modular Adapter	2
90Y4373	A3N2	IBM 300GB High IOPS SLC Modular Adapter	2

For more information, see the list of IBM Redbooks Product Guides in the Internal Storage category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=internalstorage

Power supplies

The IBM System x iDataPlex dx360 M4 2U chassis, type 7913, supports up to two redundant hot-plug power supplies, providing N+N redundancy. These High Efficiency (HE) Platinum AC power supplies are 80 PLUS Platinum certified to allow for the best efficiency values of your data center. Power supplies support 100 - 240 V. The following table lists the power supplies.

Table 14. Power supplies

Part number	Feature code	Description	Max quantity supported	Chassis model where used
94Y5975	A22M	IBM System x 550W High Efficiency Platinum AC Power Supply	2	-
94Y5974	A1G8	IBM System x 750W High Efficiency Platinum AC Power Supply	2	-
94Y5973	A1G7	IBM System x 900W High Efficiency Platinum AC Power Supply	2	A2x

The power supply options support the following configuration maximums:

IBM System x 550W High Efficiency Platinum AC Power Supply:

- Processors with TDP of 70 W or less
- Two processors
- Eight UDIMMs
- Any drive configurations
- PCIe slots (no PCIe tray support)
- 1+1 redundant (second power supply is redundant)

IBM System x 750W High Efficiency Platinum AC Power Supply:

- Processors with TDP of 80 W or less
- Two processors
- 16 DIMMs
- Any drive configurations
- PCIe slots (no PCIe tray support)
- 1+1 redundant (second power supply is redundant)

IBM System x 900W High Efficiency Platinum AC Power Supply:

- All processors
- Two processors
- 16 DIMMs
- Any drive configurations
- PCIe slots and PCIe tray support
- 1+1 redundant (second power supply is redundant)

Integrated virtualization

The server supports VMware ESXi installed on a USB memory key. The key is installed in a USB socket inside the server. The following table lists the virtualization options.

Table 15. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8300	A2VC	IBM USB Memory Key for VMware ESXi 5.0	1
41Y8307	A383	IBM USB Memory Key for VMware ESXi 5.0 Update1	1
41Y8311	A2R3	IBM USB Memory Key for VMware ESXi 5.1	1
41Y8382	A4WZ	IBM USB Memory Key for VMware ESXi 5.1 Update 1	1
41Y8385	A584	IBM USB Memory Key for VMware ESXi 5.5	1
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1

Remote management

The server contains IBM Integrated Management Module II (IMM2), which provides advanced service-processor control, monitoring, and an alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM2 lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. Optionally, the IMM2 also provides a virtual presence capability for remote server management capabilities.

The IMM2 provides remote server management through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Common Information Model (CIM)
- Web browser

The optional virtual media key is required to enable the remote presence and blue-screen capture features. The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with 16 M colors, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM2 memory and mapping it to the server as a virtual drive

The blue-screen capture feature captures the video display contents before the IMM2 restarts the server when the IMM2 detects an operating-system hang condition. A system administrator can use the blue-screen capture to assist in determining the cause of the hang condition. The following table lists the remote management option.

Table 16. Remote management option

Part number	Description	Maximum quantity supported
90Y3901	IBM Integrated Management Module II Advanced Upgrade	1

Supported operating systems

The dx360 M4 with E5-2600 v2 processors supports the following operating systems:

- Microsoft Windows HPC Server 2008
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)

The dx360 M4 with E5-2600 processors supports the following operating systems:

- Microsoft Windows HPC Server 2008
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2012
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 with Xen for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.1
- VMware ESXi 4.1
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)

See the IBM ServerProven® website for the latest information about the specific versions and service levels supported and any other prerequisites:
http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml

The supported GPU and coprocessor adapters can be used with the operating systems as listed in the following table:

Table 17. Operating system support for GPU and coprocessor adapters

Operating system	NVIDIA Quadro 5000	NVIDIA Tesla M2070Q	NVIDIA Tesla M2090	NVIDIA Tesla K10	NVIDIA Tesla K20	NVIDIA Tesla K20X	NVIDIA Grid K1	NVIDIA Grid K2	Intel Xeon Phi 5110P	Intel Xeon Phi 7120P
Microsoft Windows Server 2012	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server 2008 R2 (SP1)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server 2008, Datacenter x64 Edition (SP2)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server 2008, Enterprise x64 Edition (SP2)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server 2008, Standard x64 Edition (SP2)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server 2008, Web x64 Edition (SP2)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft HPC Server 2008	N	N	N	N	N	N	N	N	N	N
SUSE LINUX Enterprise Server 11 for AMD64/EM64T (SP2)	Y	Y	Y	Y	Y	Y	N	N	Y	Y
SUSE LINUX Enterprise Server 11 w/ Xen for AMD64/EM64T (SP1)	N	N	N	N	N	N	N	N	N	N
SUSE LINUX Enterprise Server 10 for AMD64/EM64T (SP4)	N	N	N	N	N	N	N	N	N	N
Red Hat Enterprise Linux 6 Server x64 Edition (U4)	Y	Y	Y	Y	Y	Y	N	N	Y	Y
Red Hat Enterprise Linux 5 Server x64 Edition (U9)	Y	Y	Y	Y	Y	Y	N	N	N	N
Red Hat Enterprise Linux 5 Server w/ Xen x64 Edition	N	N	N	N	N	N	N	N	N	N
VMware vSphere (ESXi) 5.1 (U1)	N	N	N	N	N	N	Y	Y	N	N
VMware vSphere (ESXi) 5.0	N	N	N	N	N	N	N	N	N	N
VMware ESXi 4.1	N	N	N	N	N	N	N	N	N	N

Physical and electrical specifications

dx360 M4:

- Width: 444 mm (17.5")
- Height: 46 mm (1.8")
- Depth: 509 mm (20.0")
- Weight: 6.7 kg (with 1 processor and 2 DIMMs)

dx360 M4 2U chassis dimensions:

- Width: 446 mm (17.6")
- Height: 87 mm (3.4")
- Depth: 555 mm (21.8")
- Weight: 5.4 kg (shell without power supplies), 7.2 kg (with two power supplies)

Supported environment

Temperature:

- Server powered on: 5 - 40 °C (50 - 104 °F)
- Server powered off: 5 - 45 °C (50 - 113 °F)

Relative humidity: 10 - 80%

Electrical requirements

- Models with 900 W power supplies:

    - 100 - 127 (nominal) V ac; 50 Hz or 60 Hz; 7.8 A
    - 200 - 240 (nominal) V ac; 50 Hz or 60 Hz; 3.8 A
    - Input kilovolt-amperes (kVA) (approximately):
        - Minimum configuration: 0.12 kVA
        - Maximum configuration: 1.04 kVA

- Models with 750 W power supplies:

    - 100 - 127 (nominal) V ac; 50 Hz or 60 Hz; 5.3 A
    - 200 - 240 (nominal) V ac; 50 Hz or 60 Hz; 2.6 A
    - Input kilovolt-amperes (kVA) (approximately):
        - Minimum configuration: 0.12 kVA
        - Maximum configuration: 0.86 kVA

- Models with 550 W power supplies:

    - 100 - 127 (nominal) V ac; 50 Hz or 60 Hz; 5.3 A
    - 200 - 240 (nominal) V ac; 50 Hz or 60 Hz; 2.6 A
    - Input kilovolt-amperes (kVA) (approximately):
        - Minimum configuration: 0.12 kVA
        - Maximum configuration: 0.63 kVA

BTU output

- Minimum configuration: 348 Btu/hr (120 watts)
- Maximum configuration: 3013 Btu/hr (1040 watts)

Noise level

- 5.7 bels (idle)

Warranty options

The IBM System x iDataPlex dx360 M4 has a 3-year onsite warranty with 9x5/next business day terms. IBM offers the warranty service upgrades through IBM ServicePacs, discussed in this section. The IBM ServicePac is a series of prepackaged warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

IBM ServicePac offerings are country-specific. That is, each country might have its own service types, service levels, response times, and terms and conditions. Not all covered types of ServicePacs might be available in a particular country. For more information about IBM ServicePac offerings available in your country visit the IBM ServicePac Product Selector here:

https://www-304.ibm.com/sales/gss/download/spst/servicepac

The following table explains warranty service definitions in more detail.

Table 18. Warranty service definitions

Term	Description
IBM onsite repair (IOR)	A service technician will come to the server's location for equipment repair.
24x7x2 hour	A service technician is scheduled to arrive at your customer's location within two hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
24x7x4 hour	A service technician is scheduled to arrive at your customer's location within four hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
9x5x4 hour	A service technician is scheduled to arrive at your customer's location within four business hours after remote problem determination is completed. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays. If after 1:00 p.m. it is determined that onsite service is required, the customer can expect the service technician to arrive the morning of the following business day. For noncritical service requests, a service technician will arrive by the end of the following business day.
9x5 next business day	A service technician is scheduled to arrive at your customer's location on the business day after we receive your call, following remote problem determination. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

In general, these are the types of IBM ServicePacs:

● Warranty and maintenance service upgrades

   ● One, 2, 3, 4, or 5 years of 9x5 or 24x7 service coverage
   ● Onsite repair from next business day to 4 or 2 hours
   ● One or 2 years of warranty extension

● Remote technical support services

   ● One or three years with 24x7 coverage (severity 1) or 9x5/next business day for all severities
   ● Installation and startup support for System x servers
   ● Remote technical support for System x servers
   ● Software support - Support Line
      ● Microsoft or Linux software
      ● VMware
      ● IBM Director

Regulatory compliance

The server conforms to the following international standards:

- Energy Star 2.0
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 69950-1-03
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- IEC-60950-1:2001 (CB Certificate and CB Test Report)
- Taiwan BSMI CNS 13438, Class A; CNS 14336
- China CCC (4943.1-2011), GB 9254-2008 Class A, GB 17625.1:2003
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, GOST R 51317.3.3-99
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1,EK1-ITB2000)

Rack cabinets

The dx360 M4 and the iDataPlex dx360 M4 2U chassis are designed to be installed in the IBM System x iDataPlex Rack, machine type 7825. This 100U rack (50U in each half) was specifically designed with a reduced depth to meet high-density data center requirements. It allows infrastructure components, such as switches and power distribution units, to be installed into the rack in vertical pockets without sacrificing valuable server space. The following figure shows the iDataPlex Rack.
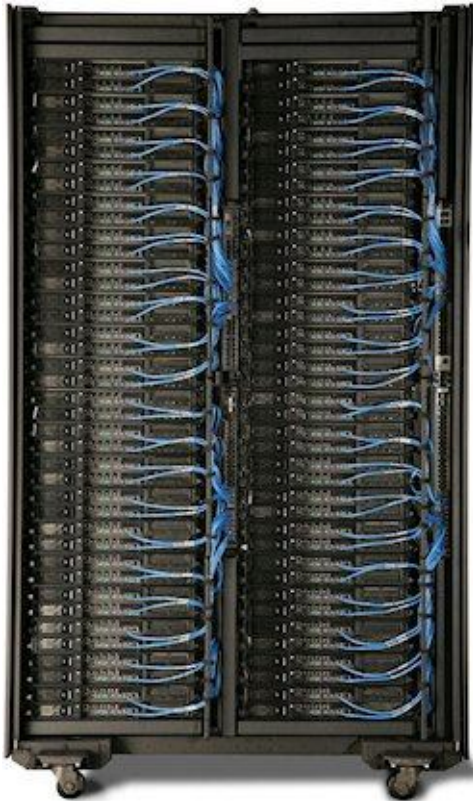
Figure 6. IBM System x iDataPlex Rack, machine type 7825

The following figure compares the footprint of the iDataPlex rack with enterprise racks.
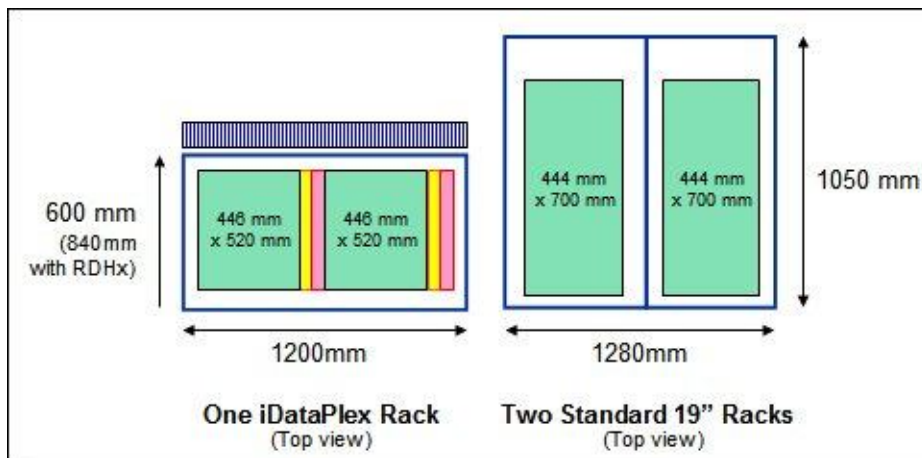
Figure 7. Comparing the footprint of the iDataPlex rack with enterprise racks

The iDataPlex dx360 M4 2U chassis can be installed in the iDataPlex rack or a standard enterprise rack.

Rail kits are listed in the following table.

Table 19. Rail kits

Part number	Feature code	Description
90Y6333	A1U9	Rail kit, iDataPlex rack with Direct Dock Power cord mounting
90Y6334	A1UB	Rail kit, iDataPlex rack (without Direct Dock Power)
90Y6335	A1UA	Rail kit, Standard rack

Direct Dock Power is an innovative way to connect power cords to servers. The power cords are industry standard cables, but each is attached to the rack in a fixed location. When you slide in the chassis, the power receptacle of the chassis simply connects to the power cord, which means that you do not have to access the rear of the rack to attach the power cord.

The following figure shows the Direct Dock Power mounting.

Figure 8. Direct Dock Power

With the standard rack rail kit, 90Y6335, the rack is supported in the enterprise racks listed in the following table.

Table 20. Rack cabinets

Part number	Description
7825	IBM System x iDataPlex Rack
201886X	IBM 11U Office Enablement Kit
93072PX	IBM 25U Static S2 Standard Rack
93072RX	IBM 25U Standard Rack
93074RX	IBM 42U Standard Rack
93074XX	IBM 42U Standard Rack Extension
93084EX	IBM 42U Enterprise Expansion Rack
93084PX	IBM 42U Enterprise Rack
93604EX	IBM 42U 1200 mm Deep Dynamic Expansion Rack
93604PX	IBM 42U 1200 mm Deep Dynamic Rack
93614EX	IBM 42U 1200 mm Deep Static Expansion Rack
93614PX	IBM 42U 1200 mm Deep Static Rack
93624EX	IBM 47U 1200 mm Deep Static Expansion Rack
93624PX	IBM 47U 1200 mm Deep Static Rack
99564RX	IBM S2 42U Dynamic Standard Rack
99564XX	IBM S2 42U Dynamic Standard Expansion Rack

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=rack

IBM Rear Door Heat eXchanger

IBM offers an alternative to standard air cooling systems with the IBM Rear Door Heat eXchanger (part number 43V6048). The Rear Door Heat eXchanger replaces the existing rear door of an iDataPlex rack and provides an extremely efficient water-based cooling solution. The exchanger dissipates heat generated by all servers and provides the data center with cooling at the most efficient place, which is immediately behind the exhaust of the system fans.

The Rear Door Heat eXchanger has the following specifications:

- Dimensions:

    - Width: 1190 mm (46.9 in.)
    - Depth: 120 mm (4.7 in.)
    - Height: 1995 mm (78.5 in.)

    The heat exchanger adds 127 mm (5 in.) to iDataPlex Rack depth if the casters are removed.

- Doorway dimensions:

    - Minimum height: 2020 mm (79.5 in.)
    - Recommended height: 2057 mm (81 in.)

- Weight:

    - 77 kg (170 lb) empty
    - 91 kg (200 lb) full, with water

Depending on conditions, the Rear Door Heat eXchanger can extract all heat produced by equipment using 30 kWh of energy (while operating at 90 - 94% of the door's maximum efficiency). The Rear Door Heat eXchanger does not use electricity.

Rack options

The server supports the rack console switches and monitor kits listed in the following table.

Table 21. Rack options

Part number	Description
Monitor kits and keyboard trays	
172317X	1U 17in Flat Panel Console Kit
172319X	1U 19in Flat Panel Console Kit
Console switches	
1754D2X	IBM Global 4x2x32 Console Manager (GCM32)
1754D1X	IBM Global 2x2x16 Console Manager (GCM16)
1754A2X	IBM Local 2x16 Console Manager (LCM16)
1754A1X	IBM Local 1x8 Console Manager (LCM8)
Console cables	
43V6147	IBM Single Cable USB Conversion Option (UCO)
39M2895	IBM USB Conversion Option (4 Pack UCO)
39M2897	IBM Long KVM Conversion Option (4 Pack Long KCO)
46M5383	IBM Virtual Media Conversion Option Gen2 (VCO2)
46M5382	IBM Serial Conversion Option (SCO)

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=rack

External disk storage expansion

Currently, the server does not support external storage expansion units such as the EXP3000. It can, however, be attached to supported external storage systems such as the DS3500 series, using the supported HBAs listed in the next section.

External disk storage systems

The following table lists the external storage systems that are supported by the server and can be ordered through System x sales channel. The server may support other IBM disk systems that are not listed in this table. Refer to IBM System Storage Interoperability Center for further information, http://www.ibm.com/systems/support/storage/ssic.

Table 22. External disk storage systems

Part number	Description
1746A2D	IBM System Storage DS3512 Express Dual Controller Storage System
1746A2S	IBM System Storage DS3512 Express Single Controller Storage System
1746A4D	IBM System Storage DS3524 Express Dual Controller Storage System
1746A4S	IBM System Storage DS3524 Express Single Controller Storage System
181494H	IBM System Storage DS3950 Model 94
181498H	IBM System Storage DS3950 Model 98
181492H	IBM System Storage EXP395 Expansion Unit
1746A2E	IBM System Storage EXP3512 Express Storage™ Expansion Unit
1746A4E	IBM System Storage EXP3524 Express Storage Expansion Unit

For more information, see the list of IBM Redbooks Product Guides in the Storage Systems category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=externalstorage

External backup units

The server supports the external backup attachment options listed in the following table.

Table 23. External backup options (Part 1)

Part number	Description
External tape expansion enclosures for internal tape drives	
87651UX	1U Tape Drive Enclosure
8767HHX	Half High Tape Drive Enclosure
87651NX	1U Tape Drive Enclosure (with Nema 5-15P LineCord)
8767HNX	Half High Tape Drive Enclosure (with Nema 5-15P LineCord)
Tape enclosure adapters (with cables)	
44E8869	USB Enclosure Adapter Kit
40K2599	SAS Enclosure Adapter Kit
Internal backup drives supported by external tape enclosures	
46C5364	IBM RDX Removable Hard Disk Storage System - Internal USB 160 GB Bundle
46C5387	IBM RDX Removable Hard Disk Storage System - Internal USB 320 GB Bundle
46C5388	IBM RDX Removable Hard Disk Storage System - Internal USB 500 GB Bundle
46C5399	IBM DDS Generation 5 USB Tape Drive
39M5636	IBM DDS Generation 6 USB Tape Drive
43W8478	IBM Half High LTO Gen 3 SAS Tape Drive
44E8895	IBM Half High LTO Gen 4 SAS Tape Drive
49Y9898	IBM Half High LTO Gen 5 Internal SAS Tape Drive

Table 23. External backup options (Part 2)

Part number	Description
External backup units*	
362516X	IBM RDX Removable Hard Disk Storage System - External USB 160 GB Bundle
362532X	IBM RDX Removable Hard Disk Storage System - External USB 320 GB Bundle
362550X	IBM RDX Removable Hard Disk Storage System - External USB 500 GB Bundle
3628L3X	IBM Half High LTO Gen 3 External SAS Tape Drive (with US line cord)
3628L4X	IBM Half High LTO Gen 4 External SAS Tape Drive (with US line cord)
3628L5X	IBM Half High LTO Gen 5 External SAS Tape Drive (with US line cord)
3628N3X	IBM Half High LTO Gen 3 External SAS Tape Drive (without line cord)
3628N4X	IBM Half High LTO Gen 4 External SAS Tape Drive (without line cord)
3628N5X	IBM Half High LTO Gen 5 External SAS Tape Drive (without line cord)
3580S3V	System Storage TS2230 Tape Drive Express Model H3V
3580S4V	System Storage TS2240 Tape Drive Express Model H4V
3580S5E	System Storage TS2250 Tape Drive Express Model H5S
3580S5X	System Storage TS2350 Tape Drive Express Model S53
3572S4R	TS2900 Tape Library with LTO4 HH SAS drive & rack mount kit
3572S5R	TS2900 Tape Library with LTO5 HH SAS drive & rack mount kit
35732UL	TS3100 Tape Library Model L2U Driveless
35734UL	TS3200 Tape Library Model L4U Driveless
46X2682†	LTO Ultrium 5 Fibre Channel Drive
46X2683†	LTO Ultrium 5 SAS Drive Sled
46X2684†	LTO Ultrium 5 Half High Fibre Drive Sled
46X2685†	LTO Ultrium 5 Half High SAS Drive Sled
46X6912†	LTO Ultrium 4 Half High Fibre Channel Drive Sled
46X7117†	LTO Ultrium 4 Half High SAS DriveV2 Sled
46X7122†	LTO Ultrium 3 Half High SAS DriveV2 Sled

* Note: The external tape drives listed can be ordered through System x sales channel. Server may support other IBM tape drives that are not listed in this table. Refer to IBM System Storage Interoperability Center for further information.
† Note: These part numbers are the tape drives options for 35732UL and 35734UL.

For more information, see the list of IBM Redbooks Product Guides in the Backup units category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tape

Top-of-rack Ethernet switches

The server supports the top-of-rack Ethernet switches from IBM System Networking listed in the following table.

Table 24. IBM System Networking - Top-of-rack switches

Part number	Description
IBM System Networking - 1 Gb top-of-rack switches	
0446013	IBM System Networking RackSwitch G8000R
7309CFC	IBM System Networking RackSwitch G8000F
7309CD8	IBM System Networking RackSwitch G8000DC
7309G52	IBM System Networking RackSwitch G8052R
730952F	IBM System Networking RackSwitch G8052F
427348E	IBM Ethernet Switch J48E
6630010	Juniper Networks EX2200 24 Port
6630011	Juniper Networks EX2200 24 Port with PoE
6630012	Juniper Networks EX2200 48 Port
6630013	Juniper Networks EX2200 48 Port with PoE
IBM System Networking - 10 Gb top-of-rack switches	
7309DRX	IBM System Networking RackSwitch G8264CS (Rear to Front)
7309DFX	IBM System Networking RackSwitch G8264CS (Front to Rear)
7309BD5	IBM System Networking RackSwitch G8124DC
7309BR6	IBM System Networking RackSwitch G8124ER
7309BF7	IBM System Networking RackSwitch G8124EF
7309G64	IBM System Networking RackSwitch G8264R
730964F	IBM System Networking RackSwitch G8264F
7309CR9	IBM System Networking RackSwitch G8264TR
7309CF9	IBM System Networking RackSwitch G8264TF
0719410	Juniper Networks EX4500 - Front to Back Airflow
0719420	Juniper Networks EX4500 - Back to Front Airflow
IBM System Networking - 40 Gb top-of-rack switches	
8036BRX	IBM System Networking RackSwitch G8332 (Rear to Front)
8036BFX	IBM System Networking RackSwitch G8332 (Front to Rear)
8036ARX	IBM System Networking RackSwitch G8316R
8036AFX	IBM System Networking RackSwitch G8316F

For more information, see the list of IBM Redbooks Product Guides in the Top-of-rack switches category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tor

Additional edge switches are offered as part of the IBM Intelligent Cluster™ program, as listed in the following table.

Table 25. Switches in the IBM Intelligent Cluster program

Feature code	Description
1 Gb top-of-rack switches	
2733	Cisco 2960G-48TC-L (48 port, Layer 2)
Not available	Juniper EX4200 (48 port, Layer 2/3)
6941	SMC 8126L2 (26 port, Layer 2)
6673	SMC 8150L2 (50 port, Layer 2)
10 Gb top-of-rack switches	
A1M6	Cisco 3750X-48T-L (48 port, Layer 2/3)

Uninterruptible power supply units

The server supports attachments to the uninterruptible power supply (UPS) units listed in the following table.

Table 26. Uninterruptible power supply units

Part number	Description
Rack-mounted UPS	
21304RX	IBM UPS 10000XHV
53951AX	IBM 1500VA LCD 2U Rack UPS (100V/120V)
53951KX	IBM 1500VA LCD 2U Rack UPS (230V)
53952AX	IBM 2200VA LCD 2U Rack UPS (100V/120V)
53952KX	IBM 2200VA LCD 2U Rack UPS (230V)
53953AX	IBM 3000VA LCD 3U Rack UPS (100 V/120 V)
53953JX	IBM 3000VA LCD 3U Rack UPS (200 V/208 V)
53956AX	IBM 6000VA LCD 4U Rack UPS (200 V/208 V)
53956KX	IBM 6000VA LCD 4U Rack UPS (230 V)
53959KX	IBM 11000VA LCD 5U Rack UPS (200V/208V/230V)

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

Power distribution units

The server supports attachments to the power distribution units (PDUs) listed in the following table.

Table 27. Power distribution units (part 1)

Part number	Description
Switched and Monitored PDUs	
46M4002	IBM 1U 9 C19/3 C13 Active Energy Manager DPI® PDU
46M4003	IBM 1U 9 C19/3 C13 Active Energy Manager 60A 3 Phase PDU
46M4004	IBM 1U 12 C13 Active Energy Manager DPI PDU
46M4005	IBM 1U 12 C13 Active Energy Manager 60A 3 Phase PDU
46M4167	IBM 1U 9 C19/3 C13 Switched and Monitored 30A 3 Phase PDU
46M4116	IBM 0U 24 C13 Switched and Monitored 30A PDU
46M4119	IBM 0U 24 C13 Switched and Monitored 32A PDU
46M4134	IBM 0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU
46M4137	IBM 0U 12 C19/12 C13 Switched and Monitored 32A 3 Phase PDU
Enterprise PDUs	
71762MX	IBM Ultra Density Enterprise PDU C19 PDU+ (WW)
71762NX	IBM Ultra Density Enterprise PDU C19 PDU (WW)
71763MU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU+ (NA)
71763NU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU (NA)
39M2816	IBM DPI C13 Enterprise PDU without linecord
39Y8923	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208 V) fixed line cord
39Y8941	DPI Single Phase C13 Enterprise PDU without line cord
39Y8948	DPI Single Phase C19 Enterprise PDU without line cord
Front-end PDUs	
39Y8934	DPI 32 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8935	DPI 63amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8938	30 amp/125 V Front-end PDU with NEMA L5-30P connector
39Y8939	30 amp/250 V Front-end PDU with NEMA L6-30P connector
39Y8940	60 amp/250 V Front-end PDU with IEC 309 60A 2P+N+Gnd connector

Table 27. Power distribution units (part 2)

Part number	Description
Universal PDUs	
39Y8951	DPI Universal Rack PDU with US LV and HV line cords
39Y8952	DPI Universal Rack PDU with CEE7-VII Europe LC
39Y8953	DPI Universal Rack PDU with Denmark LC
39Y8954	DPI Universal Rack PDU with Israel LC
39Y8955	DPI Universal Rack PDU with Italy LC
39Y8956	DPI Universal Rack PDU with South Africa LC
39Y8957	DPI Universal Rack PDU with UK LC
39Y8958	DPI Universal Rack PDU with AS/NZ LC
39Y8959	DPI Universal Rack PDU with China LC
39Y8962	DPI Universal Rack PDU (Argentina)
39Y8960	DPI Universal Rack PDU (Brazil)
39Y8961	DPI Universal Rack PDU (India)
0U Basic PDUs	
46M4122	IBM 0U 24 C13 16A 3 Phase PDU
46M4125	IBM 0U 24 C13 30A 3 Phase PDU
46M4128	IBM 0U 24 C13 30A PDU
46M4131	IBM 0U 24 C13 32A PDU
46M4140	IBM 0U 12 C19/12 C13 60A 3 Phase PDU
46M4143	IBM 0U 12 C19/12 C13 32A 3 Phase PDU

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

IBM Global Financing

IBM Global Financing can help you obtain the IT solution you need while preserving funding for other strategic investments and optimizing cash flow. Our Fair Market Value (FMV) lease helps ensure that you have the latest IBM technology and with our mid-lease upgrade capability, you can increase the capacity of the system with little to no change in monthly payments. At the end of the lease, take advantage of our flexible end-of-lease options to fit your changing business needs. IBM Global Financing has the breadth and depth of offerings, longevity, proven success and global reach to help you develop a robust financing and asset management strategy that provides you the opportunity to leverage new technologies and turn your ambitious vision into a tangible solution.

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- Expand your purchasing power—Affordable monthly payments allow you to change the technology acquisition discussion from "what can I afford right now" to "what solution is really right for my business." IBM Global Financing allows you to expand your purchase power to get you the right solution.

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- Easy to acquire with affordable rates—We offer one-stop shopping for a total IT solution, so you can acquire IBM hardware, software, services and the financing you need—from one IT provider.

Plus, we provide simple, easy-to-understand contracts and quick approvals. As the world's largest IT financing provider, with an asset base of US$35.8 billion and over 125,000 customers, IBM Global Financing offers highly competitive rates that promote low total cost of ownership and low monthly payments.

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Related publications and links

For more information see these resources:

- IBM Redbooks publication *Implementing an IBM System x iDataPlex Solution*, SG24-7629
http://www.redbooks.ibm.com/abstracts/sg247629.html

- IBM System x iDataPlex dx360 M4 product page
http://www.ibm.com/systems/x/hardware/rack/dx360m4/index.html

- ServerProven hardware compatibility page for the dx360 M4
http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/xseries/7912.html

- IBM Redbooks Product Guides for IBM System x servers and options
http://www.redbooks.ibm.com/portals/systemx?Open&page=pgbycat

- Configuration and Option Guide
http://www.ibm.com/systems/xbc/cog/

- xREF - IBM System x Reference Sheets
http://www.redbooks.ibm.com/xref

- IBM System x Support Portal
http://ibm.com/support/entry/portal/

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